ESCI 114 – Discoveries in Earth, Environmental and Planetary Sciences

An introduction to the Department of Earth, Environmental and Planetary Sciences.

Course-level objectives and learning outcomes

Students will …

- Learn about the problems and questions related to the Earth and other planets, as well as the environment that motivate research at Rice's Department of Earth, Environmental and Planetary Sciences (EEPS).
- Learn through discussions with graduate students and faculty about the broad range of research done at EEPS.
- Meet graduate students and faculty in EEPS.
- Read and discuss with EEPS graduate students research articles, including some written by Rice students and faculty.
- Tour labs at EEPS.
- See demonstrations of computer simulations related to the environment, atmosphere and planetary interiors.

Instructor

Helge Gonnermann (helge@rice.edu; Office KWG 219; ext. 6263). For office hours make an appointment or come by my office.

Class hours

Tu 1:00-1:50 PM

Class room

KWG 227

Grade policy

The course is graded as Satisfactory (S) / Unsatisfactory (U). A 'satisfactory' grade will require attendance as well as the preparation of a brief report at the end of the semester.

Absence policy

Presence and participation during all classes is expected. Excused absences require that the student contact Prof. Gonnermann in order to be excused.

Statement of expectations regarding course work and the Rice Honor Code

Throughout it is expected that you adhere to the Rice Honor Code.

Students with disabilities

Any student with a disability that requires accommodation should contact both the course instructor during the first week of classes and also Disability Support Services in the Allen Center.

Course structure

The course will meet on Tuesdays between 1:00 and 1:50 pm and will be subdivided into modules, each typically spanning one or two weeks. During a given module students will meet and interact with graduate students, postdocs and faculty from a specific research group at EEPS. Each module will be assigned to best represent the motivating problems and ensuing research done by the given research group. Any reading assignments will be provided during the prior week and the assigned reading will be discussed in class the following week. The following modules will be covered during the Fall 2019 semester.

August 27: Introduction

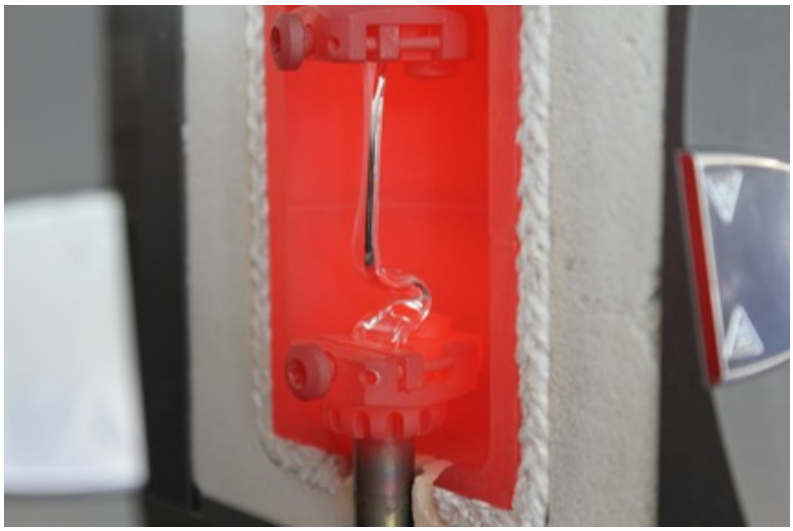
September 3: Searching for magma chambers in the Pacific Northwest

- Led by graduate student John Cornthwaite.
- Learn about the seismic search by Prof. Levander's group for magma chambers beneath America's most notorious volcano, Mount St. Helens.

Septembrer 10: Breaking rocks during earthquakes

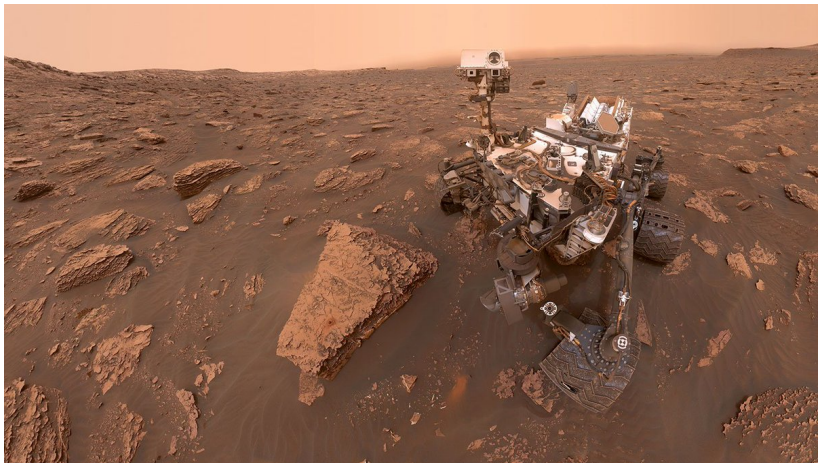
- Led by graduate student Ben Belzer and Prof. French.
- Learn how rocks break to cause earthquakes.
- See a demonstration of how earthquakes are generated in Prof. French's lab.

September 17 & 24: Erupting volcanoes: from floating pumice to black obsidian



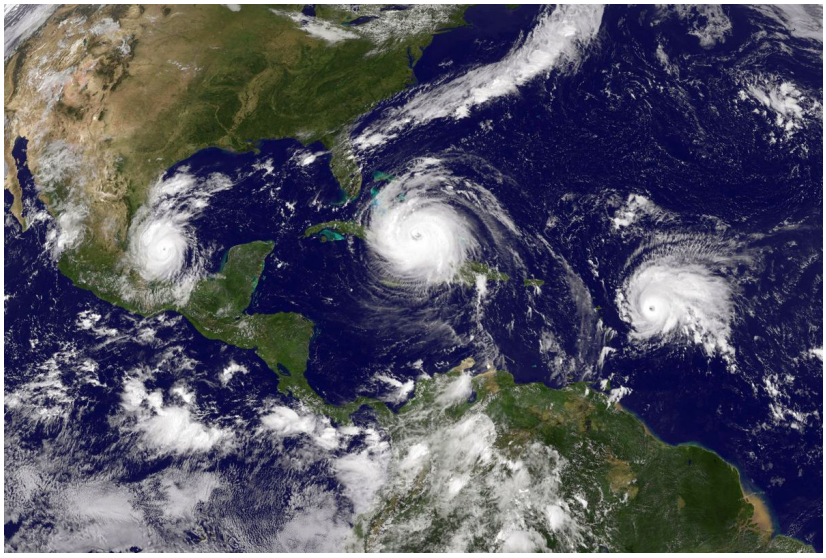
- Led by graduate student Sahand Hajimirza and postdoctoral fellow Thomas Jones.
- Learn how tiny bubbles drive volcanic eruptions.
- See a laboratory demonstration of how hot magma flows and viscosity is measured in Prof. Gonnermann's lab.

October 1 & 8: Water and sediment on Mars: Lessons from NASA's Mars Rover



- Led by graduate student Michael Thorpe.
- Learn about the Mars Rover Mission and the processes that have shaped the surface of Mars.
- Participate in a demonstration how Prof. Siebach's students explore Mars using the 3D Visualization Lab at the EEPS department.

October 22 & 29: Simulating Earth's climate

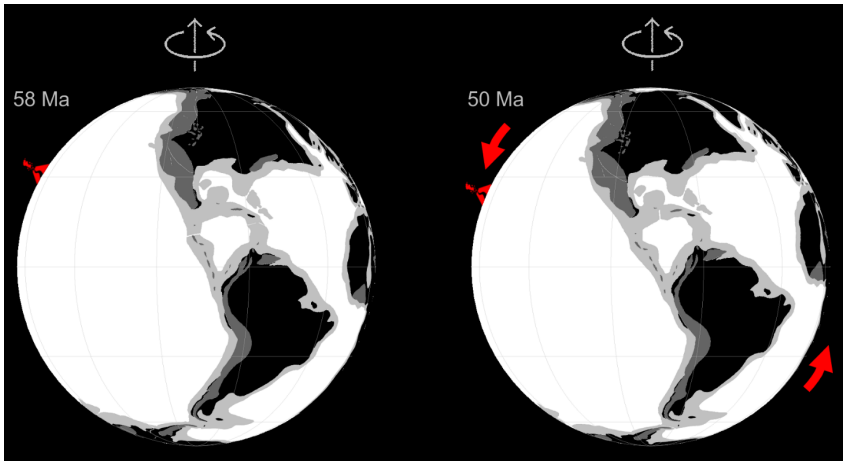


- Led by graduate student Jun Hu and Sylvia Dee.
- Learn how Prof. Dee's students use sophisticated computer models to learn about the Earth's climate.

November 5: Antarctic ice at Rice

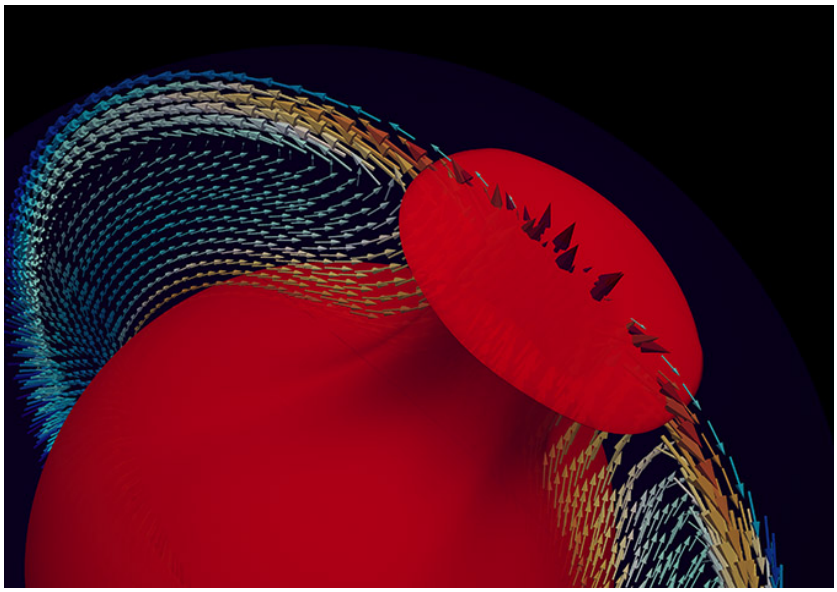
- Led by graduate students Asmita Banerjee and Boda Li.
- Learn how Prof. Yeung's students use ice cores to reconstruct Earth's climate.
- Take a tour of Prof. Yeung's ice and isotope labs.

November 12: When north wasn't north and why it matters



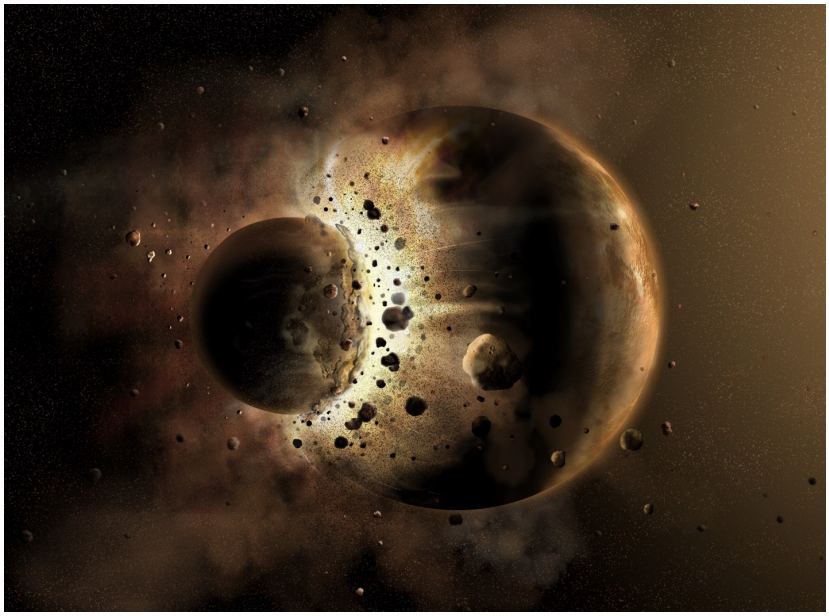
- Led by graduate students Kevin Gaastra.
- Learn how Dr. Gordon's group uses the shape of magnetic striping on the seafloor to explore how Earth's orientation has changed relative to its spin axis, and how that has affected Earth's tectonics and climate.

November 19 & 26: Why the ground beneath our feet is always moving and why it matters for life on our planet



- Led by graduate student Alana Semple Semple .
- Learn how Dr. Lenardic's group uses high performance computing to understand how the Earth's interior moves continents and thereby affects climate and life.

December 3: What cooking at extreme heat and pressure tells us about making a habitable planet?



- Led by graduate student Damanveer S. Grewal (sometime after mid October, 2019).
- Learn how Dr. Dasgupta's group uses laboratory experiments to unravel inner workings of Earth and planets and learns about processes that lead to long-term habitability of rocky planets.